TECHNICAL OFFER FOR HYPECUT4020

2200W LASER CUTTING MACHINE

Mar. 3, 14

Supplier: Penta-Chutian Laser (Wuhan) CO, Ltd

About Penta-Chutian

Headquartered in Wuhan, Penta-Chutian is a JV company by EL.EN Group and Chutian Laser Group, the two leading manufacturers in Italian and Chinese laser industry respectively. Penta-Chutian's incorporation is purposed to provide the industry a high-quality laser solution with the high-power laser cutting machines.

Who we are

- A ambitious laser cutting machine manufacturer that enjoys a leaping growth over the past 3 continuous years;
- The major exporter of high-power laser cutting machine in China;
- Provides the 1st laser cutting equipment to China's Launch Vehicle industry;
- A professional laser cutting machine supplier for China's high-speed rail industry;

The quality of Penta-Chutian's products is guaranteed by the state-of-the-art Italian technology, and the local integration procedure is also under the strict supervation by Italian engineers to ensure full compliance with European standards.

Penta-Chutian's products' stablity and cost-performance builts itself a popular reputation across industries; and its offices have been set up in most major Chinese cities to serve its fast growing market.

A glance at Penta-Chutian

HYPE-CUT Laser Cutting Machine

HypeCut 4020 C2200

Technical data

Table Travels:	mm	**X Axis 4000** **Y Axis 2000** **Z Axiz 150**
Max. Speed:	m/min	**85**
Max. Acceleration:	G	**1**
Static Accuracy (VDI 3441)**:**	in/in (mm/mm)	**0.0015/60 (0.038/1500)**
Repeatability:	in (mm)	**0.0006 (0.015)**
Load Capacity:	Kg（average）	**1000**
Overall System Weight:	Kg	**14,500 (including pallet server)**
Life span:	25 years	

Machining capability

Material	**Max. Thickness**
Mild Steel	**16 mm**
Stainless Steel	**6-8 mm (for standard 7.5” lens)**

Why HypeCut 4020 C2200:

- ***High Performance Yaskawa motors*** fixed to a gantry and cross slide structure
- Superior edge quality plus high cutting speed
- **High precision** driven box using World Leader-Top Quality Rack & Pinion Drive Technologies and Gearbox
- A ***fast flow*** laser source with ***2200W*** power (new ELEN models ***Compact C2200 CO_2 DC Lasers***)
- Advanced European ***dual processor CNC system*** for axial movement
- **Direct laser control** with **PWM** (Pulse Width Modulation)
- **5.0"** and **7.5"** Focal Length High Pressure Lenses with **Digital focus adjustment**
- ***Automatic Gas Assist*** System
- Advanced Cutting ***Head anti-collision*** device
- ***Pallet shuttle system*** with two 4000mm by 2000mm working pallets
- ***Windows™ Driven Control Software*** with Materials Parameters Database
- Fully Interlocked ***Safety Enclosure*** on cutting table
- Advanced **Metal Cutting Post Processor** software (Lantek, Alma, AutoCAD)
- ***Quick*** and ***easy*** installation with ***no special foundation required*** *

Advantages

- ***Gantry Structure***
- ***High Speed & High Acceleration***
- ***Over 80% parts are imported***
- ***Constant Improvements***
- ***Italian Technology***

* Requires a stable, vibration free working area. Machine floor location should be level with no more then 2.5cm deviation for entire footprint. Floor area should be free of any cracks with a minimum thickness of 15.0cm.

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Laser

The new generation laser resonators with power of ***2.2kw*** encompasses decades of experience in the field of high power ***CO_2 laser*** sources. The beam focus tolerance to center is maintained within 5.0% of the nozzle orifice diameter. Beam perpendicularity is maintained to within 2 milli-radians and centered to the cutting lens within 2.5mm radius.

The great thermo-mechanical stability of the laser resonator permits its use in the most extreme industrial conditions. The ***innovative double Kinematic support system*** guarantees total disjunction between the laser performances and the mechanical and thermo-mechanical movements of the chassis. This patented solution gives to the resonator an exceptional stability and repeatability in both the long and short term.

Equipped with **fast flow axial CO2 laser source**, HYPE-CUT CNC Laser Cutting Machine distinguishes itself from that of slab laser source of the same power with much higher photoelectric transformation efficiency, less give-off of heat and thus need of low power water-cooling unit.

Due to the adoption of electromagnetic oil-free centrifugal turbine to laser source of EL.EN,HYPE-CUT can realize **maintenance-free for 40,000 hours**; the laser source utilizes modular laser power technology, which is of good directivity and no reshaping, so the use of optic devices is low and maintenance is as simple as of low cost.

El.En Compact Laser series

high power CO_2 Laser

- ***Wavelength*** *10.6µm*
- ***Laser Power*** 2200W
- ***Power Stability*** 3%
- ***Gas Mix composition*** CO_2 N_2 He (4:26:70)
- ***Gas mix Consumption*** 25 Normal liter / hour (Normal liter: 1 liter at atmosphere pressure)
- The new C2200 DC lasers uses 30% less power than other RF laser sources, which complements the machine's operating costs

Standard Cutting Head

Wuhan Penta-Chutian employs **auto-focus cutting head** developed by the parent company- EL.EN to the newly-released HYPE-CUT CNC Laser Cutting Machine. Auto-focus saves a lot of time and enormously improves the efficiency of production and quality of piercing. With piercing sensor supervising the piercing process of the medium sheets, it can raise the rate of finished product; reduce loss caused by poor cutting and at the time increase cutting speed. In addition, the cutting head is equipped with **non-contact capacitive sensor,** reflection-proof device and collision protection function and the cutting head and focus lens can withstand the pressure of 27.5 bar of gas.

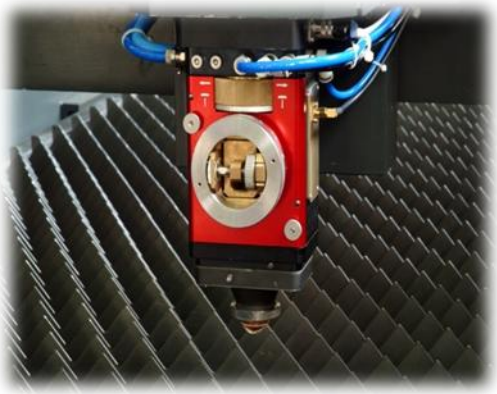
Making use of auto-focus cutting head on HYPE-CUT Series Laser Cutting Machine make Penta-Chutian again the pacemaker of both domestically and internationally integrated laser cutting machine and have better price quality ratio.

Quick and convenient lens-changing: HYPE-CUT CNC Laser Cutting Machine provides the users with both 5.0 inch and 7.5 inch lens so that the user can apply different lens according to different thickness.

Stable Z axis floating function: With sensitive non-contact level sensor and control under the system, stable Z axis floating function is available, which can deal with the effect caused by uneven sheets, making HYPE-CUT CNC Laser Cutting Machine achieve much higher rate of finished product than the other domestic laser cutting machine; There is no need of oil blast before cutting, so it takes the user less work and installation cost of assisting tools.

Collision-proof and returning when running into breakpoint: Cutting head adopts flexible design, competent of collision-proof and automatic reset, which automatically stops cutting and flexibly diverges and resets when accidental collision occurs, and moreover pick up from the former point, making the whole cutting process free from effect.

Auto focus and fast piercing: With auto focus and fast piercing functions of the cutting head, user can adjust and change different materials and thickness, greatly improving working efficiency. For example, 16mm-carbon steel under non-blasting piercing can be finished within 4 seconds.



CNC Control Specifications

CNC control unit (former the Z32) is an ***independent PC-based Numerical Control*** (placed in the electrical cabinet together with machine peripherals). It runs the software module "SIS.Z32". This module contains the ***real-time operating system*** of Z32; it elaborates the part-program, controls the machine movements and executes the PLC.

- 6 Interpolating processes, max 31 axes (6 are spindles)
- 5-Axes interpolation (for each process)
- Up to 1024 I/O
- Optical fiber field bus Z-Link and Z-Ser
- Ethernet TCP/IP
- Reading speed of up to 11.000 Blocks/sec
- Look-ahead of more than 190 blocks
- Dynamic and geometric JERK Control
- Gantry axes
- RTCP (Rotating Tool Centre Point) for heads and tables
- Special High-speed machining algorythms G113X and G113X KA1

As standard feature the **Z32 CNC system** comes with an ***Ethernet interface*** (therefore Internet on the long distance) as the communication system between the machine controller, the Operator Console, the part-program management center and the remote service center.
The data exchange protocol allows, with the greatest easiness, the realization of integrated programming and service networks.

The Z32 supports advanced Gantry algorithm allowing continuously monitoring of the gantry currents and positions. Furthermore it enables all axes ***dynamic*** and ***geometric JERK Control*** and ***High-speed*** machining algorithms ***G113X*** and ***G113X KA1***.

Drivers

Hardware parts are greatly standardized. Digital motor drivers are used for the X,Y and W axes combined with full resolution linear scales. The digital control processes up to 256 sub divisions for the single scale pitch, ensuring high position precision.

I/O lines

Communication between hardware modules is through optical fiber, to radically eliminate any problem of electrical noise. Operation is sure and reliable also in extremely hostile and noisy environments up to 1024 I/O.

Control System

The ***Penta Chutian HypeCut System*** is complete with is front-end software: ***Z32 Control System***. This software has been developed within the ***Windows XP Professional*** environment. ***It eliminates the possibility of memory overrun***.

Specifications and Features:

- Color TFT monitor 17"
- Hard Disk capacity 20GB for NC programs
- Floppy disk drive and USB 2.0 port (for easy ISO file load)
- Ethernet TCP/IP and optional WiFi network connection
- Fast and Easy Smart Menager program to work easly and safely with the machine
- Automatic Z-axis capilbration procedure
- User friendly interface to control the system with text error messaging
- Programmable Cutting Gas Pressure
- Piercing Control System
- Direct Laser Control System handling power modulation and pulsing features

The critical motion system remains housed in a ***PC based*** real time machine control, so that the expected performance and reliability is maintained. The merging of the control and the Windows ™ based PC is invisible to the operator.

The control easily ***facilitates graphic***, conversational and conventional ISO formats for manual data input programming. The ***built in cutting database*** assists inexperienced operators to choose optimal cutting parameters including advance head set table **to cut small hole on thick material** (about half of the material thickness).
The system can also communicate with an off-line computer via Ethernet connection (cable and 2nd LAN board supplied by ***Penta Chutian-ElEn***).

Operator console unit

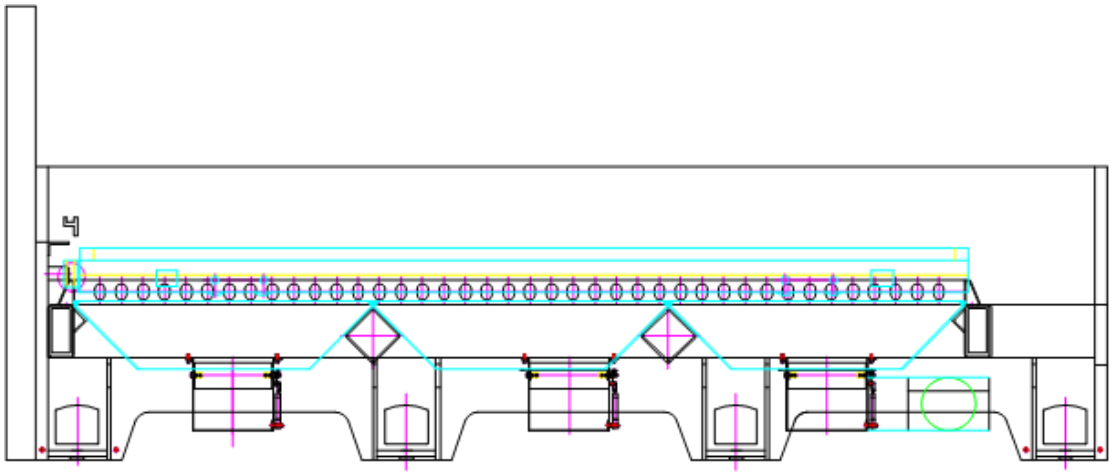
Operating Software

Smart Manager is software imported from Italy, commonly used in Europe, and developed within the *Windows XP Professional* environment. It can be fully connected with CNC system, so the control and update of the software of the machine tool and laser source would be easier and faster. Main features of Smart Manager are as below:

- User friendly interface facilitates learning and operating. The computerized numerical control, NC program is of good readability.
- Equipped with cutting database, the cutting parameters can be timely adjusted in the course to achieve best quality.
- Various drilling modes are optimized, like continuous drilling, pulse drilling, blasting piercing and so on.
- Many moving modes are optimized, having leapfrog function and automatic turnoff of the assisting gas when fast moving.
- Easier and faster automatic edge-finding function
- Cutting head automatic calibration function and the response time of Z axis is intensively increase

Table

The **base** is constructed using ***sturdy stress relieved steel fabrication*** with way surfaces ground for the mounting of the high precision rack guides.



The ***gantry structure*** is designed from Aluminum and is **extremely rigid**; yet, lightweight to achieve and maintain high acceleration.

The ***work area*** is 4000mm in the X axis direction and 2000 mm in the Y axis. The pallet is 4000 by 2000, allowing the position of the clamps outside the working area.

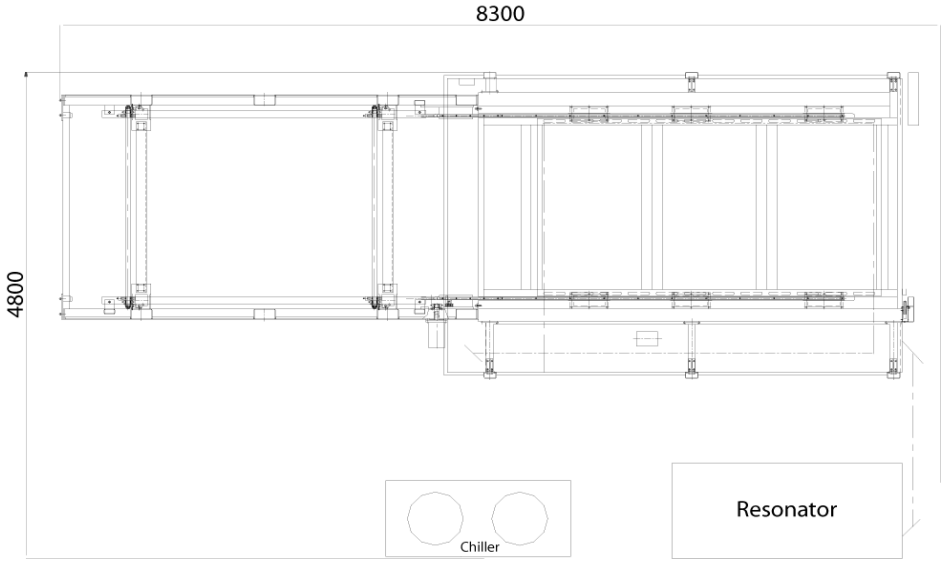
Automatic dross cleaner: the cutting table is divided into three areas, all the cutting dross will be collected through a drawer from each area, and then goes to a bulk under the table through a moving chain.

Fume extraction: the pulse and filtered type of suction system will take off the wasted cutting assisting gas and smoke produced during the cut from the table, filtered and then released to the environments.

Cooling water is maintained at ideal operating temperature via a chiller that assures correct cooling of the internal laser system. The chiller is equipped with dual line water services. The first is targeting the Laser. The second one is used for the external optics and cutting head lens: this feature eliminates the risk of condensation.

Work Support

The work piece is supported by a grid assembled from replaceable components. The system itself may be used to manufacture additional replacement grid, using programs provided by ***Penta Chutian***. The grid work is adaptable, and spacing and support material type may be varied to suit the application.

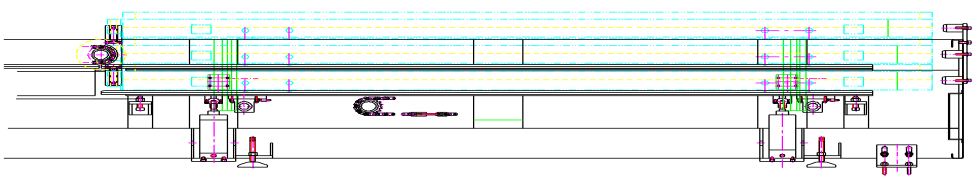


Optional manual clamps for clamping sheets are provided for ultimate cutting accuracy upon requesting

The HypeCut footprint[1] including the Pallet Changer

The Pallet Server

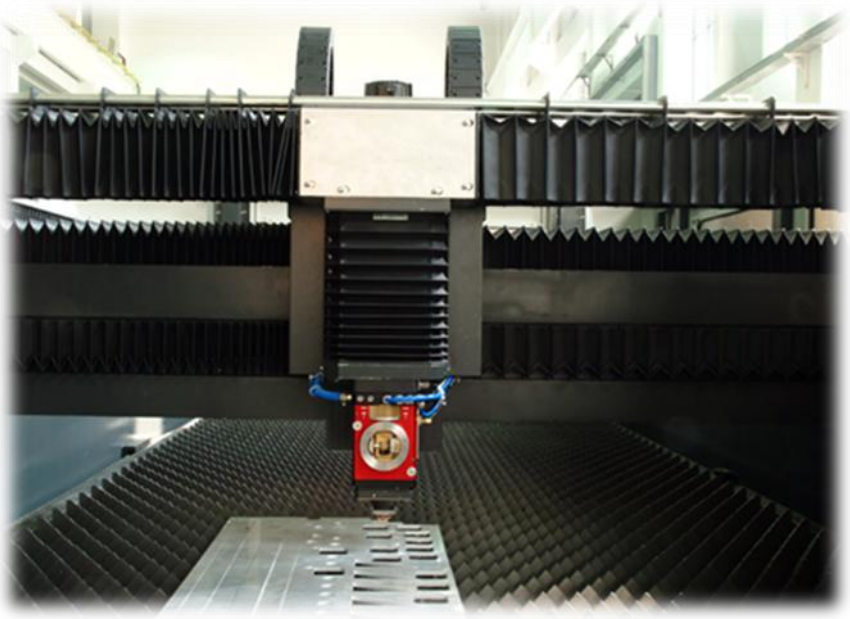
The load-unloading system with pallet exchanger (dual pallet shuttle) is designed to quickly handle up to a 1800 Lbs (800Kg) sheet per pallet. Both pallet shuttles can have 7 ***clamps*** for ***securing thin sheet***.



[1] Layout may vary as client's space availability

Automatic Gas Assist System

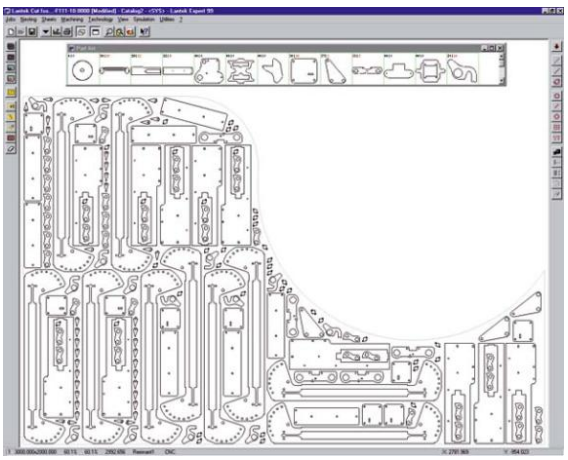
- The HypeCut front end software is equipped with sophisticated control of the cutting service gas. In particular each gas pressure can be adjusted from 150 mBar to 6 Bar in the case of compressed air and oxygen, and from 150 mBar to 20 Bar in the case of nitrogen.
- All the information on service gas is specified in the Head Set tables and in the zone indicated by number 7 in Figure 1 showing the specifications currently programmed for service gas. These state the type of gas (air, oxygen etc…) and the required pressure.
- Furthermore, the effective gas pressure can be read, and this information is also displayed on screen; if the effective pressure reading then differs from the set value by more than a specified threshold, an alarm signal is then activated, i.e. the real pressure value changes from red to yellow.



Laser diode

The ***Penta Chutian HypeCut system*** includes an optical aid (laser diode) that easily allows shifting the origin to any point of the sheet, manually (MDI mode) or automatically done by the control.

Lantek software CAD/CAM system



The PowerCut software package includes a standard Cad 2D license plus advance metal cutting features, such as Auto Nesting, Pre-Piercing, Auto lead in-out. It converts standard DWG and DXF files into HypeCut ISO file.

Air filter

Compressed air is an important process and energy medium applied in almost all areas of industrial production. The atmospheric air taken in contains contaminants, dirt particles and humidity, i.e. water vapor which condensates in compressed air pipes. This condensation can lead to considerable costs (corrosion, freezing, etc.). These costs can be avoided by the application of an ultrapac 2000 dryer. This complete purification system includes a prefilter with automatic condensate drain, adsorption dryer and after-filter. The prefilter retains solids and condensate (oil/ water mixture) up to a residual oil content of 0.03 ppm. The ultrapure 2000 breathing air systems are purification units based on adsorption dryers ultrapac 2000 to supply breathing air in excess of all relevant international standards and medical prescriptions.

Chiller System (optional)

XUEHAI water chilling system:

Completely self contained, installed in 3 easy steps!

1. Connect supply and return lines
2. Connect correct power to the disconnect
3. Fill the reservoir & piping
4. Double temperature circuit system

-Fused disconnect on 3-phase models

-304 Stainless steel reservoir

-All models have digital temperature controllers

Main parts of the system

Sequence Number	Name	Amount	Manufacturer & Brand
Article1	**Laser Source**		
i	2200W Laser Source	1 unit	EL.EN Group, Italy
Article2	**External Beam Path and Cutting Head**		
i	Cutting Head	1 piece	EL.EN Group, Italy
ii	Lens in the external beam path	1 set	II-VI Company, America
Article3	**Main Frame**		
i	Mechanical Flat Table and Parts	1 unit	Penta-Chutian Laser (Wuhan) CO, Ltd
ii	X, Y Axial Rack and Pinion	I set	ATALANTA, Germany/GUDEL, Switzerland Precision: DIN 6h
iii	Guide	1 set	THK, Japan
iv	Accessories	1 set	Penta-Chutian Laser (Wuhan) CO, Ltd
Article 4	**CNC system and software**		
i	Z32 CNC System (including Control Software)	1set	EL.EN Group, Italy
ii	Servo Motor and Drivers	3sets	YASKAWA, Japan
iii	Automatic CAD&CAM Software	1 set	LANTEKM, Spain
iv	Cutting Database	1 set	EL.EN Group, Italy
Article 5	**Standard Auxiliary Systems**		
i	Pallet Exchanger	1set	Penta-Chutian Laser (Wuhan) CO, Ltd
ii	Suction System	1set	Domestic Match
iii	Dross collector	1set	Penta-Chutian Laser (Wuhan) CO, Ltd
iv	Gas reducer	4 pieces	Shanghai
Article 6	**Options**		
I	Air Compressor and Dryer	1set	Atlas Wuxi
ii	Cooling System	1 set	Domestic Match
iii	Stabilizer	1set	Shanghai

Working Conditions

<table>
<tr><td>ITEMS</td><td colspan="6">CONTENTS</td></tr>
<tr><td>1</td><td colspan="6">Electricity capacity: 90KVA</td></tr>
<tr><td>2</td><td colspan="6">Requirements for the power supply: (recommend the stabilizer)
(1)Output power: 380V
(2)Stability of the tri-phase: +10%
(3)Adjustability of the output voltage: <2%</td></tr>
<tr><td>3</td><td colspan="6">Gas supply for the compressed air (Recommend are screw type compressor, tank, dryer and Oil-Water filters)
(1)Capacity: 1 m^3
(2)Nominal pressure: 10 bar
(3)Air purity: residual oil content of 0.03 ppm</td></tr>
<tr><td rowspan="6">4</td><td colspan="4">Mix gas requests:</td><td colspan="2">Assisting gas</td></tr>
<tr><td>Gas</td><td>Proportion</td><td>Percentage</td><td>Precision</td><td>Gas</td><td>Percentage</td></tr>
<tr><td>CO_2</td><td>4%</td><td>≥99.995 %</td><td>±10% (3.6%~4.4%)</td><td>O_2</td><td>≥99.995 %</td></tr>
<tr><td>N_2</td><td>26%</td><td>≥99.999 %</td><td>±5% (24.7%~27.3%)</td><td>N_2</td><td>≥99.99 %</td></tr>
<tr><td>He</td><td>70%</td><td>≥99.998 %</td><td>±5% (76.5%~79.5%)</td><td></td><td></td></tr>
<tr><td colspan="6">Note that the Praxair is recommended</td></tr>
<tr><td>5</td><td colspan="6">Cutting material:
The cutting material should be equal and flat, clean on the surface without paint and oxidation. The material has also to be suitable for the laser cutting process and to have a high standard quality.</td></tr>
</table>

Section 1: Training

Advance training*: Penta Chutian-El.En* will provide up to five (5) days of training on machine operation and advanced training on software operation. This will be done at Penta Chutian facility in Wuhan, China, prior to shipment of the system. Living and travel expenses are not included.

On-site training: the seller will provide up to 1-2 weeks of training on the machine operation, maintenance, laser operating, cutting parameters, graphics edition, common troubleshooting, etc. The on-site training includes up to 1-2 weeks of one seller's technician at the buyer's site, the visa, international ticket, meal and living expenses are covered by the buyer.

Section 2: Warranty (A, B, C, D)

Penta Chutian, warrants to the original purchaser of the system, that it shall be free of defects as follows:

A.Warranty includes Labor and Parts for ONE (1) year / 2000 hours

- Drive Mechanisms
- Bearings
- Basic Structural Integrity of Positioner
- Laser
- Motors and Mag Tracks
- Way Strips
- Other Mechanical Systems
- Electrical / Electronic Systems

B.Warranty does not include:

- Travel expenses to and from the customer site for purposes of warranty repair
- Shipping expenses for warranty/non-warranty replacement parts
- Optical elements (lenses, bending optics)
- Consumable items such as, but not limited to, nozzles, material support pins, crossbars, pallets and surface followers, etc.
- Damage to machine resulting from a collision or other misuse
- Damage caused by materials not recommended for Laser process

Equipment must be regularly serviced in accordance with Penta Chutian-El.En.'s machine documentation. If service work is required on a warranted ***Penta Chutian System***, it must be performed by either:

- ***Penta Chutian-El.En.*** Service Technician
- Subcontractor provided by ***Penta Chutian-El.En.***
- Service Technician, authorized by ***Penta Chutian-El.En.***, in writing and in advance of performance of the service work

It is understood that ***Penta Chutian-El.En.*** has no control over the method in which a laser system is used and makes no warranties with regard to the use of the system for a specific purpose or product unless specifically agreed upon by an authorized ***Penta Chutian-El.En.*** representative in writing, prior to the sale of the system.

C.Warranty shall be null and void if:

-Any revisions, adjustments or repairs are made to the warranted system without written permission from ***Penta Chutian-El.En.***

-Damage to the system, including:

1. Damage caused by fire, theft, windstorm, malicious acts, etc.
2. Damage to the system through misuse by the customer
3. Damage to the system through the use of a faulty or non-conforming utility or service such as electric power, gases, water or air
4. Failure to perform the recommended maintenance as outlined in the manual
5. Failure to notify ***Penta Chutian-El.En.*** with timely written notice of a defect or problem

Section 3: Spare Kits

1 ea. – Ceramic kit	1 ea. – 5" high pressure lenses
10 ea. – Nozzle tips	1 ea. – 7.5" high pressure lenses
1 ea. – Cleaner optical aerosol	2 ea. - Relay

Section 4: Lantek Power Cut

The PowerCut software package includes a standard Cad 2D license plus advance metal cutting features, such as Auto Nesting, Pre-Piercing. It convert standard DWG and DXF files into HypeCut ISO file.

Section 5: Installation

The supplier shall provide the demander with installation layout plan (including requirements for Civil engineering, water, electricity, use level of gas and piping.)Within 15 days upon and from the date on which the business contract is signed.

Installation shall be carried out in user's factory and the user must prepare enough room, power supply, ventilating system and equipment for installation. Installation shall be taken charge of by extremely well trained engineer of the supplier. The supplier is responsible for installation of the equipment (including installation of the vent) and testing. The user should cover the layout, water pipe, gas pipe, electrical cables for the installation and should fully cooperation with our engineers, the job for connecting all the pipes and cables are covered by our engineer.

The installation includes up to 6-8 days of 3 Penta Chutian technicians at the buyer's site, the visa, international ticket, meal and living expenses are covered by the buyer.

Section 6:After-sale Service

1） Within warranty period, if any quality related defect occurs on the equipment, the buyer shall reply and provide maintenance instructions through phone or conduct on-sight service. In terms of on-sight service are demanded,

on-sight service requires seller's technicians stay at buyer's site, therefore, the visa, international ticket, meal and living expenses are covered by the buyer.

2） Within warranty period, seller will be responsible for any damage caused by the quality problem of the equipment by free parts replacing and service.

After warranty period expired, the seller's well trained service engineer shall provide phone service or conduct on-sight service. If replacement of the components is required, seller shall charge buyer on the replaced components with the fair market price; and buyer shall be responsible for any possible occurring expense to seller's service engineer such as visa, international ticket, meal and living expenses.